



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,091	05/01/2001	Eric Arthur Swanson	SYCS-042 (P96)	5732
959	7590	02/24/2005	EXAMINER	
LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			KIM, DAVID S	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/847,091

Applicant(s)

SWANSON, ERIC ARTHUR

Examiner

David S. Kim

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2633

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Admitted prior art in view of Ramaswami et al.

2. **Claims 1-13 and 15-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Ramaswami et al. (*Optical Networks: A Practical Perspective*).

Regarding claim 1, consider Fig. 1C of the admitted prior art. Note that the drawing shows unidirectional links connecting each node to another node by using single line arrows. However, also note that Fig. 1B and p. 2, l. 6-7 disclose more than one path represented by each single line arrow, a working path and a protect path. In view of this plurality of paths represented by each single line arrow in Fig. 1B, one of ordinary skill in the art can reasonably conclude a similar plurality of paths represented by each single line arrow in Fig. 1C, a working path and a protect path.

Next, note that the specification discusses span protection (p. 2, l. 29) and a shadow span that diversely protects each span between nodes (p. 3, l. 19-20). However, the details of this span protection and shadow span are not expressly disclosed. Nonetheless, in view of the plurality of paths represented by each single line arrow in Fig. 1C, a working path and a protect path, one of ordinary skill in the art can reasonably expect a span protection scheme and shadow span that incorporate a working path and a protect path.

Such protection schemes and shadow spans are well known and common throughout the art. Ramaswami et al. teaches three such schemes and spans (p. 430-432, Figure 10.2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement one of these schemes and spans as the protection scheme and span of the apparatus of the admitted prior art, for example, 1:1 protection. One of ordinary skill in the art would have been motivated to do this since they are all conventional protection schemes and spans that are suitable to the apparatus of the admitted prior art to provide resilience against failures (Ramaswami et al., p. 430, 1st full paragraph). For motivation to implement, for example, 1:1 protection, there are advantages of capacity for extra lower-priority traffic and of sharing a single protect path among many working paths (Ramaswami et al., p. 432, 2nd full paragraph).

In short, this combination of the admitted prior art and Ramaswami et al. simply provides 1:1 (or 1:N) protection as the span protection scheme and shadow span of the admitted prior art.

In view of this combination, claim 1 reads on one case of operation:

the failure of the working span between switch 54 and amplifier 60 in Fig. 1C.

An optical sub-assembly for processing an optical signal, the sub-assembly comprising:
a working path of the optical network (working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art);

a first sub-band (C-band or L-band, p. 7, l. 28-29) of the optical signal carried only by the working path (no signal on protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art);

Art Unit: 2633

a protect path (protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art) of the optical network;

a second sub-band (L-band or C-band, p. 7, l. 28-29) of the optical signal carried only by the protect path (no signal on working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art);

a first module disposed along the working path for affecting the working path (amplifier 58 in Fig. 1C); and

a second module disposed along the protect path for affecting the protect path (amplifier 60 in Fig. 1C);

wherein wavelengths of the optical signal of the first sub-band (amplifier 58 handles one bundle of wavelengths, p. 3, l. 26-27) are non-overlapping (C-band and L-band are non-overlapping) with wavelengths of the optical signal of the second sub-band (amplifier 60 handles a different bundle of wavelengths, p. 3, l. 28).

Note that this rejection relies on an observation that independent claim 1 is broad enough to read on an obvious case of operation of the admitted prior art in view of Ramaswami et al. Additionally, note that Examiner's application of "sub-band" in this rejection may match Applicant's intentions. As a way to obviate this rejection, Examiner suggests adjustment to the language of the independent claims by adding further distinguishing limitations of Applicant's apparatus so that this obvious case, and other obvious cases, of operation of the admitted prior art in view of Ramaswami et al. do not apply.

Regarding claim 2, the admitted prior art in view of Ramaswami et al. discloses:

The sub-assembly of claim 1, wherein the first sub-band is one of a C-band and an L-band (C-band or L-band, p. 7, l. 28-29), and the second sub-band is the other of a C-band and an L-band (L-band or C-band, p. 7, l. 28-29).

Art Unit: 2633

Regarding claims 3-10, the admitted prior art in view of Ramaswami et al. discloses:

The sub-assembly of claim 1, wherein the first and second modules are comprised of:

(claim 3) optical amplifiers (amplifiers 58 and 60).

(claim 4) band pass filters (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, passing one band to one output and passing another band to another output, p. 2, line 30 – p. 3, line 4).

(claim 5) channel add devices (add/drop node 66 plus further instances of add/drop nodes, not shown in Fig. 1C, in expanded versions of the apparatus).

(claim 6) channel drop devices (add/drop node 66 plus further instances of add/drop nodes, not shown in Fig. 1C, in expanded versions of the apparatus).

(claim 7) demultiplexers (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, p. 2, line 30 – p. 3, line 4).

(claim 8) multiplexers (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5).

(claim 9) interleavers (switches 54 and 68 that demultiplex input signals depending on the wavelength of the signals, directing one band of signals to one output and then alternately directing, or interleaving, another band of signals to another output, p. 2, line 30 – p. 3, line 4).

(claim 10) attenuators (any of the above devices have some measure of finite insertion loss, attenuating input signals).

Regarding claim 11, the admitted prior art in view of Ramaswami et al. does not expressly disclose:

The sub-assembly of claim 1, wherein the first and second modules are comprised of: dispersion compensation modules.

However, these modules are extremely well known and common in the art. Dispersion is an effect that has been studied for decades in the field of optical communications. Generally,

Art Unit: 2633

dispersion limits the transmission distance of optical signals. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate dispersion compensation modules in the apparatus of the admitted prior art. One of ordinary skill in the art would have been motivated to do this to compensate for the effect of dispersion, reducing the limiting effect of dispersion, thus lengthening the transmission limits of the optical signals of the admitted prior art in view of Ramaswami et al.

Regarding claim 12, refer to the case of operation described in the treatment of claim 1 above: the failure of the working span between switch 54 and amplifier 60 in Fig. 1C.

A method of processing an optical signal in an optical network, comprising the steps of: separating (L/C splitter, p. 7, l. 27-29) the optical signal into a first sub-band (C-band) supporting only (no signal on protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art) a working path (C-band working path, p. 7, l. 28-29; working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art) and a second sub-band (L-band) supporting only (no signal on working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art) a protect path (L-band protect path, p. 7, l. 31-32; protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art);

routing the first sub-band through a first module (module that is band-dependent for C-band, p. 7, l. 25-27; e.g., amplifier 58 in Fig. 1C) to form the working path and routing the second sub-band through a second module (module that is band-dependent for L-band, p. 7, l. 25-27; e.g., amplifier 60 in Fig. 1C) of the same type as the first module to form the protect path; and

recombining the first and second sub-bands (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5);

Art Unit: 2633

wherein wavelengths of the optical signal of the first sub-band (amplifier 58 handles one bundle of wavelengths, p. 3, l. 26-27) are non-overlapping (C-band and L-band are non-overlapping) with wavelengths of the optical signal of the second sub-band (amplifier 60 handles a different bundle of wavelengths, p. 3, l. 28).

Regarding claim 13, the admitted prior art in view of Ramaswami et al. discloses:

The method of claim 12, wherein the separating step comprises the step of routing the optical signal through an L/C splitter (L/C splitter, p. 7, l. 27-29).

Regarding claims 15-22, claims 15, 16, 17, 18, 19, 20, 21, and 22 are method claims that correspond to apparatus claims 3, 4, 5, 6, 7, 8, 9, and 10, respectively. Therefore, the recited means in apparatus claims 3-10 read on the corresponding steps in method claims 15-22.

Regarding claim 23, claim 23 is a method claim that corresponds to apparatus claim 11. Therefore, the recited means in apparatus claim 11 read on the corresponding steps in method claim 23.

Regarding claim 24, refer to the case of operation described in the treatment of claim 1 above: the failure of the working span between switch 54 and amplifier 60 in Fig. 1C.

An optical amplifier node for amplifying an optical signal, the amplifier node comprising:

a first amplifier (amplifiers 58) for amplifying only signals from a first sub-band (C-band or L-band, p. 7, l. 28-29) of the optical signal, wherein the signals are carried only by a working path (working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art; no signal on protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 58 in Fig. 1C of the admitted prior art); and

Art Unit: 2633

a second amplifier (amplifier 60) for amplifying only signals from a second sub-band (L-band or C-band, p. 7, l. 28-29) of the optical signal, wherein the signals are carried only by a protect path (protection span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art; no signal on working span in Figure 10.2 of Ramaswami et al., located on span between switch 54 and amplifier 60 in Fig. 1C of the admitted prior art);

wherein wavelengths of the optical signal of the first sub-band (amplifier 58 handles one bundle of wavelengths, p. 3, l. 26-27) are non-overlapping (C-band and L-band are non-overlapping) with wavelengths of the optical signal of the second sub-band (amplifier 60 handles a different bundle of wavelengths, p. 3, l. 28).

Regarding claim 25, the admitted prior art in view of Ramaswami et al. discloses:

The optical amplifier node of claim 24, further comprising a sub-band splitter (L/C splitter, p. 7, l. 27-29) for splitting the optical signal into at least two sub-bands.

Regarding claim 26, the admitted prior art in view of Ramaswami et al. discloses:

The optical amplifier node of claim 25, wherein the sub-band splitter is an L/C splitter (L/C splitter, p. 7, l. 27-29).

Regarding claim 27, the admitted prior art in view of Ramaswami et al. discloses:

The optical amplifier node of claim 24, further comprising a sub-band combiner for combining at least two sub-bands into the optical signal (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5).

Regarding claim 28, the admitted prior art in view of Ramaswami et al. discloses:

The optical amplifier node of claim 27, wherein the sub-band combiner is an L/C combiner (switches 62 and 76 that multiplex input signals together, p. 2, line 32 – p. 3, line 5, combining L-band signals and C-band signals)

Response to Arguments

Admitted prior art alone

3. In view of Applicant's amendments to the claims, filed on 05 October 2004, the rejection of the claims under the admitted prior art alone has been withdrawn.

Admitted prior art in view of Ramaswami et al.

4. Applicant's arguments, filed on 05 October 2004, with respect to the claims rejected under the admitted prior art in view of Ramaswami et al., have been fully considered but they are not persuasive. These arguments are largely based on the most recent amended version of the claims that focus on the following limitation:

“wherein wavelengths of the optical signal of the first sub-band are non-overlapping with wavelengths of the optical signal of the second sub-band” (independent claims 1, 12, and 24).

Examiner respectfully notes that the admitted prior art in view of Ramaswami et al. teaches this limitation. See the treatment of claims 1, 12, and 24 above for further details. Accordingly, Examiner respectfully maintains the standing rejections.

Additionally, note that this limitation is a broader version of dependent claim 2, which was also rejected in the previous Office Action (mailed on 15 January 2004). Dependent claim 2 further defines the first sub-band as one of a C-band and an L-band and further defines the second sub-band as the other of a C-band and an L-band. This express designation of sub-bands to defined bands of optical wavelengths is a narrower version of the limitation that was newly introduced to independent claims 1, 12, and 24 on 05 October 2004. As this narrower limitation of dependent claim 2 was rejected in the previous Office Action and is still rejected in this present Office Action, it stands to reason that the broader limitation newly introduced to independent claims 1, 12, and 24 is also rejected in this present Office Action.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 09/847,091

Page 11

Art Unit: 2633

DSK

M. R. Sedighian
M. R. SEDIGHIAN
PRIMARY EXAMINER